May 1965

Brief 65-10140

NASA TECH BRIEF

Galvanic Corrosion Reduced in Aluminum Fabrications

The problem: When aluminum panels are joined with pins or fasteners of metals other than aluminum, severe corrosion can occur as the result of electrochemical action between the dissimilar metals. Although titanium 6Al-4V alloy is a lightweight metal of sufficient strength to be used as a fastener material, it is cathodic with respect to aluminum, so that the latter will be subject to preferential corrosion when the bare metals are in contact. Protective coatings on either of the metals may be scratched or abraded when the fasteners are installed and thus expose the aluminum to galvanic corrosion.

The solution: Titanium 6Al-4V alloy fasteners after being dipped in zinc chromate primer are installed while still wet in aluminum panels which have been given a protective coating.

How it's done: The aluminum panels are first cleaned with an alkaline solution and dilute nitric acid and then covered with any one of several commercially available chemical protective coatings. (Anodizing is preferable for small-sized panels.) The fasteners are then dipped in zinc chromate primer and while still wet are installed in the coated panels. A second coat of primer is applied to the assembly to eliminate any bare areas that may have developed on the external surfaces. This procedure not only protects all of the metal surfaces against galvanic corrosion but also provides moisturetight seals at the fastener joints.

Note:

Inquiries concerning this invention may be directed to:

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Reference: B65-10140

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

Source: Marshall Space Flight Center
(M-FS-272)

Categories No. 03 & 05